

REMARKS

Claim 21 has been amended to further define the structure of the present invention and claim 22 has been canceled.

The following remarks regarding the prior art and the present invention reflect the discussion between the examiner and the applicants' representative during an office interview held on June 16, 2004.

Claims 21, 22, and 10 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent 6,395,859. While the discussion below will show that applicants believe that it is not obvious to one skilled in the art to incorporate particular hydrolyzable linkages into particular polymeric structures to obtain a workable binder system for energetic materials with specific properties, applicants have co-filed a terminal disclaimer with this response (a copy is attached) in order to obviate this grounds for rejection.

Claims 21, 22, and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tremblay (U.S. 4,415,728) in view of Kuczynski (U.S. 5,872,158). Specifically, the examiner indicates that Tremblay discloses the basic diol polymer of the present invention and Kuczynski teaches that formal linkages are hydrolyzable in a monomer. The examiner further asserts that combining these two teachings would be obvious to one skilled in the art to obtain the present invention.

Applicants respectfully provide the following information to traverse this rejection. Applicants believe that while Kuczynski does disclose that formal linkages are hydrolyzable under certain conditions in a certain monomer configuration, it would not be obvious to one skilled in the art to use the disclosure of Kuczynski in conjunction with creating a diol linked

prepolymer, useable with energetic materials, that hydrolyzes under the conditions of the present invention.

First, in general, Kuczynski discloses a monomer, that is not useful in the preparation of an energetic polymer--i.e. very different than a diol prepolymer of the present invention, that is hydrolyzable due to a formal linkage in the backbone. The present invention discloses a chain linked prepolymer having repeating O-CH₂-O formal units within the backbone. Chemically, this is a different structure, and, therefore, one would not assume that the two structures would comprise similar properties.

To further illustrate this fact, Kuczynski indicates that using two methyl groups attached to the carbon in the formal creates the most easily hydrolyzable prepolymer (versus using hydrogens as in the present invention). However, Kuczynski uses harsh organic solvents under drastic conditions (heated to reflux) in order to hydrolyze the monomer disclosed therein. The present invention (even though it uses the formal which Tremblay teaches is the hardest to hydrolyze) hydrolyzes under normal conditions (room temperature) in a dilute aqueous acidic solution.

Second, Kuczynski teaches away from the present invention by indicating that, while a specific formal (not the formal linkage used in the present invention) might hydrolyze in acidic aqueous solutions, one should not use such solutions for hydrolysis of formal containing linkages due to problematic reactions (transesterification under acidic conditions) caused by such solutions (see col 4, lines 24-34). Therefore, Kuczynski uses organic solvents and acids under a high temperature to obtain hydrolysis for his monomer. When dealing with binders for energetic systems, it is not possible to use such harsh conditions to hydrolyze the binders due to the energetic components being bound thereby. Therefore, one skilled in the art, creating a

prepolymer for an energetic binder, such as the present invention, would likely not consider a hydrolyzable linkage that must use organic solvents and other harsh conditions to obtain hydrolysis. Thus, Kuczynski would teach one skilled in the art away from the present invention.

Third, based upon the teaching above related to the hydrolysis of formals, the present invention shows unexpected results by fully hydrolyzing using a marginally acidic aqueous solution, at room temperature, without transesterification problems, allowing a user to reclaim the energetic components being bound by the present invention. This type of unexpected result should be sufficient to overcome any obviousness related to the Kuczynski reference.

Fourth, as further evidence of non-obviousness of the present invention, applicants submit a declaration that provides specific information refuting the general proposition that one skilled in the art, knowing that formal linkages are hydrolyzable for a monomer structure, would find it obvious to insert such a linkage in a specific diol linked prepolymer to obtain the present invention. One major problem with the general proposition, as described in detail in the declaration, is that forming formals within many diol polymeric structures results in the formation of physical properties that would not be useable for energetic binder systems. Also, applicants disagree with the general proposition that it is obvious to take a known hydrolyzable linkage and insert it into a polymeric structure to obtain a hydrolyzable polymeric structure because there are many hydrolyzable linkages, known in the art, that will not result in such a hydrolyzable polymer. As indicated in the declaration, many hydrolyzable linkages will not work with the diol structure of the present invention to obtain the present invention for the reasons described therein. This alone provides sufficient evidence that the combination of the particular formal linkage selected and the particular diol structure selected for the present invention is not obvious based upon the prior art. Applicants have further amended the claims to

further define the diol structure of the present invention in order to more clearly show the specifics and non-obvious nature of the present invention.

Accordingly, applicant believes that claims 10 and 21 are in condition for allowance and respectfully requests the examiner to withdraw all objections and rejections and allow said claims. Should the examiner need more information regarding this matter or have further suggestions regarding this application, feel free to call the undersigned at 301-744-5603.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Mark Homer", is written over a horizontal line.

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